DOCUMENT RESUME

ED 244 187 CG 017 459

AUTHOR Norris, Raymond C.; And Others
TITLE Quality of Life and Effectiveness of Functioning in Elderly Individuals.
PUB DATE 83
NOTE 51p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Behavior Patterns; Cognitive Processes; Daily Living Skills; Gerontology; Models; *Older Adults; *Performance; Physical Health; *Quality of Life; Self Actualization; Systems Approach; Well Being
IDENTIFIERS *Personal Effectiveness

ABSTRACT

Models of well being and human functioning have traditionally been based on empirical studies done with children and young adults. As part of an ongoing research program to develop and test a model of effective functioning and positive health in older adults, 31 elderly individuals (7 males, 24 females), with a mean age of 73.58 years, completed the OARS Multidimensional Functional Assessment Questionnaire, Part A (OARS MFAQ), to assess effectiveness of functioning, and an inventory based on Flanagan's (1978) research, to assess quality of life. Several physiological and psychological measures to assess human behavioral subsystems (biophysiological, perception/cognition, and interpersonal/environmental functioning) were also administered. An analysis of the results showed that effectiveness of functioning is not a unitary trait, even in a subpopulation of elderly persons. Only mental health and activities of daily living from the OARS MFAQ, and the use of leisure time, and friends and relatives from the quality of life dimension were significantly correlated. Specifically, three factors were found to be predictive of effectively functioning elderly persons: high psychological involvement, independent functioning, and acceptance. The findings suggest that the development of a model of effectiveness of functioning in elderly persons may be possible. However, refinement of the model will depend on data from a more heterogeneous sample. A 38-item reference list and four statistical tables are included. (BL)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED244187

# QUALITY OF LIFE AND EFFECTIVENESS OF FUNCTIONING IN ELDERLY INDIVIDUALS

Raymond C. Norris
Julius Seeman
William Compton
Joyce Adkins
Linda Leftwich
Peabody College/Vanderbilt University

1983

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

X Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Raymond C. Norris

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CG 017 459

# Quality of Life and Effectiveness of Functioning in Elderly Individuals

Raymond C. Norris, Peabody College/Vanderbilt University
Julius Seeman, Peabody College/Vanderbilt University
William Compton, Peabody College/Vanderbilt University
Joyce Adkins, Peabody College/Vanderbilt University
Linda Leftwich, Peabody College/Vanderbilt University

This study is part of an ongoing program of research aimed at the development of a model of well-being and effective functioning in older adults. Early descriptions of functional capacity and health have discriminated between normality and impairment, treating "normality" as a broad undifferentiated category. More recently, research and theory construction have led to the development of expanded concepts of personal effectiveness and positive health, such that positive functioning has received more differentiated treatment. This development is significant because it not only gives added power to the description and appreciation of the human potential but, importantly, because it permits a more sensitive and accurate measurement of functioning in the upper half of the effectiveness continuum.

The practical limitation of the foregoing developments centers on the fact that much of the empirical research on which these expanded models have been based has been done with children and young adults. Little research on human effectiveness has

been done with older adults, since the natural preoccupation with this age group has been to understand and forestall impairment and decline. As a consequence, we do not yet have empirically tested models of effective functioning and positive health applicable to elderly persons.

The limitations expressed here speak to the purpose of this project. Our aim was to develop and test a model of effective functioning and positive health in older adults. Prior research with younger age groups provides useful precedents for model construction. This research has converged upon the use of a systems approach. A systems framework has the advantage of encompassing multiple variables within a single conceptual structure, thus permitting a comprehensive analysis of the influences and variables that bear upon effectiveness and health throughout the human system.

A more detailed explanation of what is meant by a systems approach will be helpful in illuminating its relevance to this project. Here a fundamental definition is in order. According to Angyal (1941), the defining characteristic of a system is unitas multiplex--that is, a system consists of multiple components bound together by a unifying structure in which each component is an integral part of the whole. Thus it may be seen that a central defining property of a system is organization. Following this principle, we have chosen to utilize a blend of

two closely related human-system frameworks as a structure for organizing our design. Human-system frameworks offered by Riegel (1979) and by Seeman (1983) permit the use of an inclusive classification system that views persons in terms of their major behavioral subsystems: biological (biochemical and physiological), psychological (perceptual and cognitive), and sociocultural (interpersonal and personal/environmental). These inclusive system categories guided our choice of variables and our search for the structure of relationships among these variables.

Prior research with children and young adults offers evidence that this model has utility in organizing the findings of disparate studies and adding to our knowledge of effective functioning. For example, in the cognitive domain, high functioning persons have been found to be flexible in their conceptualizing processes (Foxman, 1976; Heath, 1966), intellectually efficient (Duncan, 1966; Lewis, 1959; Watson, 1969), and positive in their concepts of themselves and their abilities (Barnard, 1972; Bowles & Wright, 1969; Frankel, 1970; Heath, 1966; Seeman, 1983). In the interpersonal subsystem, effectively functioning persons were found to display positive, satisfying relationships (Landsman, 1968), capacity for empathy (Swan, 1970), positive family relationships (Cooley & Seeman, 1979; Seeman, Barry, & Ellinwood, 1963). In the physiological

subsystem, high functioning persons were found to show more stability and less lability in physiological response to varied stressors (Richard, 1971) and greater capacity in modifying their skin temperature through biofeedback (Behrends & Seeman, 1983). In sum, effectively functioning persons were found to display distinctive functioning in their major behavioral subsystems.

The foregoing empirical work, together with its underlying theory, permits the development of a working definition of the concept effective functioning. The term effective functioning may be taken to include those constellations of behavior that are adaptive, that contribute to a person's positive physical and mental health, that utilize the person's resources, and that are satisfying to the person. Operational meanings of the term will be clarified in the description of the variables and instruments used in this study.

## METHOD

### Overview of Design

The design of the study followed from its purpose; namely, to develop a model of effective functioning in elderly individuals. Within this context, two considerations governed the overall design.

1. The choice of variables followed from the fundamental premise that a human-systems approach is a fruitful framework for model construction in this study. We further specified the

behavioral subsystems that comprised the model. This specification required that we choose variables from each of the behavioral subsystems: biological (biochemical/physiological), psychological (perceptual/cognitive), and sociocultural (interpersonal, personal/environmental).

2. Given that the underlying characteristic of a system is organization, we chose a method of analysis that would provide information regarding the structure of the variables utilized in the study.

The specific questions that we addressed were as follows:

1. Is effectiveness of functioning a unitary construct among the elderly or is effectiveness in one sphere of activity independent of effectiveness in other spheres?

2. Is self-perceived quality of life independent of judged effectiveness in the elderly? If not, is effectiveness in some spheres more related to qualify of life than effectiveness in others?

3. If effectiveness of functioning is domain specific rather than general, are there different sets of personal and psychological characteristics which are predictive of effectiveness in the different domains?

## Measures

Two sets of measures were included in the design of the study. One set included a measure of effectiveness of

functioning (EF) and quality of life (QOL). The second set consisted of human behavioral subsystem (HBS) and demographic variables.

## EF and QOL Measures

The EF measure employed here utilizes factual information about an individual to the greatest extent possible. The QOL measure, on the other hand, draws on the individual's own perceptions of his or her own life satisfactions. Together they provide ten primary measures of how well elderly persons are getting along with respect to physical health, mental health, social resources, economic resources, and self-care capacity, along with their satisfaction in use of leisure time, personal development, self-fulfillment through others, family well-being, and friends and relatives.

The OARS Multidimensional Functional Assessment Questionnaire, Part A (MFAQ) developed at the Duke University Center for the Study of Aging and Human Development under AOA Grant Number 93-P-175172 (Fillenbaum et al., 1978) was utilized. As indicated in a Center report:

> The questionnaire which was developed at Duke assessed the older person's status in five areas of functioning: (1) social, (2) economic, (3) mental health, (4) physical health, and (5) activities of daily living.... Responses to questions during the interview summarized

functional impairment of the respondents in each of the five areas and a rating was assigned on a scale of 1 to 6: 6=excellent, 5=good, 4=mildly impaired, 3=moderately impaired, 2=severely impaired, 1=totally impaired.

The OARS manual provided extensive literature on the reliability and validity of the Questionnaire (Fillenbaum et al., 1978). In a large scale study of noninstitutionalized persons 65 years of age or older in Cleveland, Ohio, the U.S. General Accounting Office found that the OARS MFAQ provided a high degree of discrimination among levels of functional competence (Laurie, 1977). In this pilot study at Vanderbilt, the OARS instrument also appeared to discriminate well between those elderly persons with little or no impairment and those who were functioning really well, beyond freedom from impairment.

QOL was measured in this study by an inventory based on Flanagan's research approach to improving life quality (Flanagan, 1978) which he utilized to identify opportunities for doing that with older age groups (Flanagan, 1979). From critical incidents interviews with 2,834 50- and 70-year old men and women, Flanagan identified 15 aspects of life that are significant in determining adult life satisfaction. He subsequently obtained information on how important each aspect of life was and how well satisfied

each individual was with that life aspect in samples of 500 men and 500 women at each of two ages--50 and 70.

Although Flanagan obtained both importance and satisfaction ratings for each of the 15 aspects of life, he did not combine the two measures across life aspects to obtain a composite measure of quality of life. In a study of QOL and stress among graduate students, Carter (1983) utilized Flanagan's life aspects structure and his system of ratings for importance and satisfaction. She assigned scale values from one to five for each scale, however, and used the importance x satisfaction products as weighted satisfaction scores. Carter then summed these products across all 15 life aspects to get a single QOL index.

This study also used the weighted satisfaction approach, but the products were not summed across all 15 life aspects to get a single QOL estimate. Subsets of item products were summed instead to yield QOL factor scores for (a) active use of leisure time, (b) personal development, (c) self-fulfillment through others, (d) family well-being, and (e) friends and relatives. These factors were isolated for the graduate student samples by Apenahier, Norris, and Carter (in preparation) and applied to the responses of the elderly sample on the basis of face validity--the factors looked as though they would make sense for elderly as well as young adults. However, the factor structure of the

Flanagan-based inventory and the reliability and validity of the factor scores have not yet been determined for elderly populations.

## HBS Measures

### Inner Biological/Biophysiological

Within the biochemical/physiological subsystem, measures were selected to yield indices of effective physiological functioning and to sample broadly within the system. The categories of functioning sampled included (1) maintenance of oxygen supply and cellular nutrition, (2) maintenance of motor functioning, (3) maintenance of protective mechanisms of the body, and (4) maintenance of general health levels and practices.

1. Cellular nutrition and oxygen supply. Adequate nutrition is necessary for basic functioning of the human being. This nutrition is effected in major ways through cardiovascular, respiratory, gastrointestional, and excretory functioning. These processes were assayed by simple, noninvasive measures.

Cardiovascular and respiratory functioning were assessed through measurement of heart rate and respiration before and after exercise, and through measurement of chest circumference.

Estimates of heart rate were made from pulse rate. To obtain pulse rate, the investigator placed the first three fingers on the participant's superficial radial artery, gently pressing the artery against the radius. Rate was counted for a

duration of 15 seconds. The total obtained was then multiplied by four to get total pulsation per minute. On occasions when pulse was irregular, rate was counted for a full minute.

Count of respirations was obtained through observation by the investigator of the chest wall of the participant. Respirations were observed for 30 seconds and total count was multiplied by two to obtain total respirations per minute.

Count of heart rate and respirations was taken prior to and following mild physical exertion. The exertion consisted of a brisk walk of a premeasured 80-foot distance. The walk space was carpeted and level. Participants were instructed to walk as quickly as was comfortable for them. A measure of pre-post change was then computed for both pulse and respiration count per minute.

Chest circumference measures were obtained while the participant was in a standing position. For inspiratory measures, participants were instructed to inhale, completely filling their lungs with air. Measurement of the chest was then taken using a metal tape. Participants were then instructed to exhale completely, emptying their lungs as much as possible. Again, a metal tape was used to obtain a circumference measure. Chest circumference measures we e computed in centimeters.

A complex chain of health-related processes surround the issue of glucose tolerance. Tissues bathed in blood with high

sugar levels are more prone to infection due to the attraction of bacteria towards sugar molecules. Alterations in fluid-electrolyte states also occur with hyperglycemia. Glucose tends to pull water from intracellular spaces due to the increasing colloidal osmotic pressure. Ultimately, renal function is affected.

To assess this area of functioning, a urine specimen was collected from each participant and was tested for glucose level. In addition, protein content and ph level were assessed at the same time. Data were obtained using Comstix litmus strips.

Finally, within the category of biophysiological functioning, a measure of weight was taken. Weight was obtained in pounds using a standard hospital scale.

2. Maintenance of motor functioning within the musculoskeletal and neurological systems.

Height was measured in inches using a standard hospital scale. The measure was then converted to centimeters.

Reaction time, both visual and auditory, was measured according to the following procedure.

For the reaction time tasks, the participant was seated at a table with both hands resting in front of him or her. The person was instructed to activate a stop watch upon (a) a visual signal, and (b) an auditory signal determined to be within the hearing capacity of the participant. Reaction time was measured by the

amount of time recorded on the experimenter's stop watch at the point of the respondent's watch click. The participant was allowed five trials with the mean of the trials representing reaction time. Reaction time was recorded to the nearest hundredth of a second.

3. Maintenance of protective mechanisms of the body. The ability of the body to resist infection is an example of the functional protective status of the immune system. Effectiveness of functioning within the immune system was therefore estimated based on the number and type of infections reported by each participant for the 12 months prior to the assessment date, as well as the number of hospitalizations reported for the past year.

4. Maintenance of general health levels and practices. The Belloc-Breslow Health Practices Scale (Belloc & Breslow, 1972) was given to each participant. This scale assesses level of health by eliciting information on common health-related measures: sleep habits, eating habits, level of physical activity, use of alcohol, smoking, and height-weight relationship. The scale was validated against a measure of overall physical health (Belloc, Breslow, & Hochstim, 1971). The latter measure consists of a seven-point scale ranging from severe disability to symptom-free high-energy level.

Analysis of the Health Practices Scale indicated a strong positive relationship between number of health practices and general health level. The relationship held true at all age levels. For example, individuals with an average age of 60 years who followed all seven health practices had a health status about the same as persons 30 years younger who followed few or none of the practices. Similarly, persons over 75 years of age who followed all seven health practices had a health status similar to 35- to 44-year olds who followed fewer than three health practices.

Perceptual/Cognitive Measures

The Stroop Test. A significant component of perceptual capacity is the ability to maintain relevant task behavior in the face of irrelevant stimuli that compete for the person's attention. An instrument that embodies the measure of such behavior is the Stroop Test (Thurstone, 1944). The task required by this test is as follows: The respondent first reads lines of words that continue to repeat, in random order, the names of four colors (red, yellow, blue, green). The words themselves are printed in black ink, on white paper. In the second part of the task, the respondent is given an equal number of lines to read but this second card consists of lines of tinted circular disks that are colored red, yellow, blue, or green. The task is to name the colors. In the third and crucial part of the task,

there are lines of words that name the same four colors. The words are printed in colors. Each color name is printed in a tint different from the color that is named (e.g., the name blue is printed in green-tinted letters). The task of the respondent is to name each tint in sequence and to ignore the color name itself (e.g., in the example above, the person must ignore the name blue and name the green tint). It will be observed that in this task it is possible to measure the reaction time when there is no interference--i.e., in Card 2, where the task is simply to name the tinted discs-and to measure reaction time in the face of interfering stimuli, as in Card 3. The metric then is the ratio of time taken for Card 2 and Card 3. It is for this reason that the task is sometimes referred to as the Stroop ratio.

Research has shown that there is an interaction between age and degree of interference, with older persons exhibiting more interference (Comalli, 1962). It is also the case that older persons take significantly longer to read Cards 1 and 2, but the difference here is far smaller than is the case for Card 3. Nevertheless, the total information yield for this perception task includes time taken for each card as well as the ratio of time for Card 2 and Card 3.

The Parks Mazes. This pencil-and-paper instrument consists of nine complex mazes (Fitts, Parks, & Larson, 1982). The respondent is instructed to take the shortest route through each

maze and to complete the task as quickly as possible. Thus there is competition between speed and accuracy. The visual characteristic of the mazes is such that the respondent confronts many choices en route: apparent barriers, long winding pathways that may or may not be the best route, blind alleys, signals that require judgment as to their relevance (e.g., arrows pointing in a particular direction), and other perceptual cues. In short, the mazes represent a behavioral task that assesses such characteristics as perceptual accuracy, planning capacity, judgment, and impulse control. The instrument has not yet been published, but the manual (Fitts, Parks, & Larson, 1982) reports many studies that support its validity. For example, the maze performance differentiates between clients who complete a course of therapy and those who do not, between obese persons and persons of average weight, between persons convicted of automobile driving offenses and persons with a clear driving record, and between persons who pay bills promptly and those who do not. The foregoing findings, and others, indicate that the mazes represent a sample of performance that finds meaningful counterpart in the ongoing behavior of individuals.

The Tennessee Self-Concept Scale. The Tennessee Self-Concept Scale (TSCS) is a 100-item self-description inventory (Fitts, 1965) which has been shown to differentiate levels of personal integration within the normal range. One of its

subscales is an empirically derived Personality Integration Scale designed to assess high level of personal functioning. Otner subscales of the TSCS also contribute to identification of high-functioning persons. Studies by Duncan (1966), Seeman (1966), Hearn and Seeman (1971), and Thomas and Seeman (1972), all utilized the TSCS as a criterion measure for selecting groups differing in personality integration and all found behavioral differences in the predicted direction between high-functioning persons and other persons in the normal range. A monograph by Fitts, Adams, Radford, Richard, Thomas, Thomas, and Thompson (1971) summarizes many of these findings.

In the present study, the TSCS subscales chosen were those which had, in prior studies, shown particular differentiating power between high-integration persons and nonhigh persons within the normal range. The formula used was as follows: (Total Positive plus Identity plus Family Self plus Personality Integration) minus (2 times Defensive Positive plus General Maladjustment plus Number of Deviant Signs). The first three subscales are phenomenological self-description scales. The last three scales are empirically-derived indices of maladjustment.

The Kelly Role Repertory Test. It has been shown that individuals high in personality integration generate concepts more fluently than is the case for persons comparable in other respects but less high in personality integration (Thomas &

Seeman, 1971). This characteristic suggests that optimally integrated persons have at their disposal a large array of symbolic processes that they can use when called upon to do so. This skill has been noted in a number of different contexts (Fitts et al., 1971).

A task that has been used in prior studies and that has shown the foregoing properties is the list form of the Kelly Role Repertory Test (Thomas & Seeman, 1971). In this task, the respondents are asked to think of three persons whom they know well. They are then asked to specify all of the ways in which two of the persons are similar to each other and different from the third person. The number and variety of concepts given constitute the score.

Cognitive competence. The vocabulary subtest of the Wechsler Adult Intelligence Scale (WAIS-R) (Wechsler, 1981) was used with all participants to provide an estimate of their ability to perform "highly cognitive tasks requiring skilled judgment habits which have become crystallized as a result of earlier application of some more fundamental general ability" (Cattell, 1963). The 40 words in this subtest are presented orally and visually, and examinees are asked to state the meaning of the word. Although there is some controversy about at what ages and in what amounts vocabulary scores decline, there is general agreement that vocabulary scores tend to increase or

remain stable well into old age for healthy individuals (Cattell, 1963; Schaie, 1974; Horn & Donaldson, 1976). Split-half reliability, corrected for attenuation by the Spearman-Brown Prophecy Formula, for individuals in the age range 70 to 74 is estimated to be .95 (Wechsler, 1981).

Locus of control. Tiffany's E-C Scale (1969) is a pencil-and-paper instrument comprised of 16 questions which inquire as to the amount of control an individual experiences across a number of different social situations. Individuals respond by marking a number on a scale ranging from 0 (Low Control) to 100 (High Control) and demarked in units of 10. From these individual items are derived four scores indicating: (a) control over internal, intrapersonal pressures, (b) control exerted from internal sources, (c) control over external, interpersonal pressures, and (d) control exerted by external pressures. From these scores are derived two fractional scores (control over/control from internal, control over/control from external), expressed as natural logarithms, which indicate the degree of control experienced over pressures or forces coming from internal and external loci.

In researching this model, Tiffany et al. (1969) have found that emotionally-disturbed individuals experience significantly more external control than nonemotionally-disturbed individuals.

Also found has been a significant inverse relationship between the experience of external control by both emotionally-disturbed (-.76) and nonemotionally-disturbed (-.65) individuals and their respective self-ideal self congruencies. Based on this and other findings, they have concluded that "the experience of high control from the environment is related to one's freedom of action, is a factor in emotional disturbance, restricts one from actualizing his [her] ideal goals, constrains individual uniqueness, and instills discomfort and fear in regard to environmental situations" (1969, p. 69).

Interpersonal/Environmental

Social support. Each participant completed the Pattison Psychosocial Kinship Inventory (Pattison et al., 1975) by (a) listing the subjectively important people in his/her life under the categories of family, relatives, friends, coworkers, and social organizations; (b) rating each listed personal relationship on degree of interaction, emotional intensity, positive/negative character, instrumental nature, and symmetry; and (c) drawing a sociogram of the social connections among persons listed. Scores drawn from the Pattison were (a) Network--number of persons listed, (b) Pluses--number of ratings of 4 or 5, (c) Minuses--number of ratings of 1 or 2, and (d) Threes--number of neutral ratings.

## Research Participants

Elderly participants in the study were recruited in three ways. One investigator described the research on a local radio show on two occasions and asked interested persons over age 65 to phone a given number. The same investigator addressed a group at a local Senior Citizen Center and issued the same invitation. A request for volunteers also was placed on the bulletin board of a subsidized high-rise apartment unit for elderly men and women. Persons who volunteered in response to these requests were administered the Physical Health Spectrum (Belloc & Breslow, 1972) in a phone conversation. Only those persons who reported no major physical problem were included in the study.

A total sample of seven men and 24 women between 65 and 90 years-of-age (M = 73.58, SD = 6.71) was obtained in this way. They were consistently highly educated (M = 15.67 years, SD = 2.78) with a median income of $22,500 per year. In marital status, 14% had never married, 35% were married and living with their spouse, 39% were widowed, and 14% were divorced. All were white and living in an urban setting.

Demographic data on the apartment dweller, community, and combined samples are presented in Table 1. Tests of significance

---

Insert Table 1 about here

---

for differences in the two samples revealed that the apartment sample was (a) older ($M = 77.00$ vs. $M = 70.76$, $t = 2.87$), (b) less likely to have been married (71% vs. 100%, $\chi^2 = 5.56$), (c) less likely to be living with a spouse (7% vs. 59%, $\chi^2 = 8.97$). These differences were in the expected directions. The combined sample was much better educated, freer from major illnesses, and more prosperous than a cross-section of elderly persons in general. However, it represented a good sample of the population of particular interest to the investigators--elderly persons likely to be functioning at a normal or superior level.

## Procedures

The settings in which participants were tested, the examining team, and the mechanics of test administration differed for the community and the apartment samples. Experience gained in the individual testing of community volunteers on campus led to alternative arrangements for the apartment dwellers. Instead of being tested in a clinic and family room on campus, the apartment sample was seen in a conference room in their own building; time demands and travel difficulties were thereby reduced. Instead of all their tests being individually administered, apartment residents took several of the psychological tests as a group in one session and then were individually interviewed, given the remaining psychological tests, and given the physiological tests in a second session.

Since it was found in the community sample that the physiological measures obtained by a physician and nurses could be gotten equally well by trained psychology students, the student members of the research team did all of the testing of apartment residents.

Testing sequences for the two samples were:

| | Community Sample | Apartment Sample |
|---|---|---|
| First Session | OARS MFAQ | Activities List |
| | Quality of Life | Health Habits |
| | Pattison | Quality of Life |
| | Kelly | Pattison |
| | Parks Mazes | Parks Mazes |
| | Health Habits | Tiffany |
| | Activities List | |
| | Physiological Measures (static) | |
| Second Session | Tiffiny | OARS MFAQ |
| | WAIS-R | Stroop |
| | Physiological Measures (active) | TSCS |
| | TSCS | Kelly |
| | | WAIS-R Voc. |
| | | Physiological Measures (all) |

Instructions for all psychological tests were read aloud while the participants could read along with the test administrator. Assistance was given when needed to persons who did not understand the instructions or had trouble reading the items. With few exceptions, however, the participants were able to complete all the tests without special assistance.

Objectively scored tests were scored by the test administrators. Ratings on effectiveness of functioning in the five areas covered by the MFAQ were assigned by the examiner who conducted the interview. Periodic checks by a second rater responding only to information recorded from the interview showed the ratings to be highly consistent. The Parks Mazes were scored by an independent clinical psychologist who has used them extensively.

## RESULTS

Means, standard deviations, and intercorrelations of all measures were obtained through application of SPSS subprograms CONDESCRIPTIVE and PEARSON CORR (Nie et al., 1975). The numbers of measures included in this first data summary were:

| | |
|---|---|
| EF (5) and QOL (5) | 10 |
| HBS Physiological | 27 |
| HBS Psychological | 7 |
| HBS Sociocultural | 8 |
| Demographic | 4 |

Inspection of the intercorrelations among measures revealed few significant correlations at the .05 level involving the four demographic variables. Sex of participants was related only to the number of activities in which they engaged both alone and with others (r = .56) and family well-being (r = -.45) and positively related to impulse control as measured by the Parks Mazes (r = .42). Educational level was positively related only to vocabulary (r = .47) and to the number of constructs used in classifying persons in their social network (r = .47). Income correlated positively with participants' judged adequacy of economic resources (r = .77), with the number of activities in which they engaged alone (r = .44), and with their vocabulary (r = .38). The few significant correlations (2 or 3 out of 36 for each demographic variable) were all in expected directions. The fact that sex, age, education level, and income were not related to more characteristics of the participants was seen as an indication that the sample consisted of highly functioning men and women whose basic needs were satisfied.

Further indications of the high level at which participants were functioning were seen in the means and standard deviations of their EF and QOL measures (see Table 2). Mean ratings

---

Insert Table 2 about here

---

assigned by interviewers to the five data-based estimates of EF provided by the MFAQ were all near 5.0 (Good). Particularly noteworthy is the highest mean rating of 5.35 (between Very Good and Excellent on Activities on Daily Living) with little variation (SD = .41). Mean scores on the five QOL reveal that the participants themselves are well satisfied with their lives. (Mean scores of 15 or 16 could be obtained only by persons who viewed given aspects of their lives as at least moderately important and as being at least moderately satisfied. The relatively low QOL in Family Well-Being stems from "relationships with spouse" and "housing and raising children" being relatively unimportant at this time for persons who are not now married and whose children, if any, are grown. For elderly persons who are highly educated, in good health, financially comfortable, effectively functioning, and generally satisfied with life, sex and differences in age, education, or income appear to be relatively unimportant.

Because the number of HBS measures obtained was so large and the number of elderly subjects tested to date was so small (N = 31), only a few of the 56 measures could be used in the planned canonical correlation analyses. These few measures were selected in the following ways.

1. All EF and QOL measures were included. Since the ultimate objective of the ongoing study is a theory to relate HBS

functioning to EF and QOL, it was felt that none of these ten measures could be eliminated. Furthermore, the planned canonical correlation analysis which attempts to relate factors in one variable subset with factors in a second variable subset would treat the ten EF and QOL measures as the first, relatively small subset.

2. Factor analyses were run separately on intercorrelations among physiological measures and among combined psychological, sociocultural, and demographic measures. These analyses were run using SPSS Subprogram FACTOR: PA2 with VARIMAX rotations (Nie et al., 1975). HBS/demographic variables were then selected for inclusion in subsequent analyses which (a) were significantly correlated with EF or QOL measures, and/or (b) loaded to the extent of .30 or higher on their own subsystem factors.

This procedure reduced the numbers of subsystem variables to:

| | |
|---|---|
| EF and QOL | 10 |
| HBS Physiological | 3 |
| HBS Psychological | 3 |
| HBS Sociocultural | 3 |
| Demographic | 2 |

The specific measures, their means, and their standard deviations are presented in Table 2.

A canonical correlational analysis was then conducted using the ten EF and QOL measures as the first subtest and the 11 HBS and demographic measures as the second subtest. The matrix of intercorrelations produced by BMDP Program 6M (BMDP, 1983) is presented here as Table 3.

---

Insert Table 3 about here

---

The number of pairs of canonical variates identified depends on the level of significance used. This was not predetermined in this exploratory study. If a stringent .05 (1/20) level were applied, only two sets were significant. If a less stringent .125 (1/8) were applied, three sets might be interpreted. The less stringent criterion was applied here to encourage speculation about theoretical relationships even though the authors were aware of the potential problems of low reliability and an unfavorable participants/measure ratio.

The three pairs of canonical variates selected for interpretation are presented in Table 4. Correlations (loadings)

---

Insert Table 4 about here

---

between these variables (factors) and the original measures of .30 or greater were used to guide the interpretations of the

paired variates. Each variate pair was found to involve at least one EF and at least one QOL measure in the first subset, and one or more measures from at least three of the four HBS/demographic subset.

The canonical variables that load on each of the three pairs of factors may be described in terms of the two variable sets: the EF and QOL variables, and the HBS variables. It is of interest here also to note the kinds of relationships that obtain between the two sets of variables for each factor.

In order to make the factor descriptions more concrete, we shall describe for each factor pair a specific person whose scores are congruent with the factor structure.

Factor Pair 1: Psychological Involvement

The EF and QOL loadings on this factor pair represent satisfaction in personal development (self-understanding, learning, work, and material comforts) and in relationships with close friends and relations. A strong social support system on which the elderly persons can rely also is judged to exist.

On the HBS measures, they have positive self-concepts, they prefer to engage in activities with others rather than alone, and they appear to use much energy in these activities. Previous research suggests that individuals high in personality integration are characterized by both high environment contact

and positive self-definition. Factor 1 emphasizes these variables.

Mr. R. is a 67-year-old man who, although he retired a few years ago, still continues to work part-time in his field in order to make a little extra money. He is very involved with a number of civic and community groups as well as his friends. He is a man who rarely involves himself in solitary activities. He seems to seek out and enjoy the company of others. Mr. R. is not afraid to express his opinion on a variety of subjects and doesn't hesitate to do so. He is a very healthy man who has worked hard all his life as a tradesman and is proud of the level of comfort he has been able to provide for himself and his family. He feels good about himself and his accomplishments and looks forward to an active and healthy retirement.

Factor Pair 2: Independent Functioning

The EF measures loading on this factor pair depict persons of comfortably high economic status, in good physical health, with a good social support network, who are able to perform the activities of daily living without assistance. They are satisfied with their relationships with their spouses and with their children.

The HBS variables provide good support for this description. Such persons are in good physical condition as indicated by physiological measures, they have an affirmative view of

themselves, and they enjoy engaging in activities alone. The factor overall depicts persons who are autonomous in disposition, who are in good health, and who are economically self-sufficient.

This participant is a housewife who resides with her husband in a house of her own construction. Her husband is retired for several years, yet they continue to enjoy a comfortable income, having resources not only adequate to meet their needs but resources for emergencies and extras for small luxuries.

Mrs. A. finds life exciting and is actively involved in many daily activities. She is quite independent and creative in her thoughts and interests which lead her to engage in many activities done without the presence of others.

Nevertheless, she enjoys spending time with other people. She is actively involved in many social and community activities. She is a warm, personable individual who appears to have a genuine interest in others and reports satisfying relationships with both family and friends. Her family is especially important in her life, providing a source of much support and satisfaction.

Mrs. A. currently engages in quite strenuous physical activity on a daily basis and enjoys excellent physical health. She is also an avid nature lover, and gains much enjoyment and satisfaction from outdoor activities.

Overall, Mrs. A. is interested and feels good about all aspects of her life and appears to have a good self-concept.

Factor Pair 3: Acceptance

Persons high on this factor pair are satisfied with their leisure time activities and with their relationships with close friends and relatives at this time in their lives. They are judged, however, to not have a strong social support system on which they can rely for the future.

The HBS variables suggest that these persons have a sense of low control of external forces that affect their lives, relatively lower educational background, and good personal organization and efficiency. Overall, the description appears to characterize persons who are functioning quite adequately with a limited resource pool.

Mrs. X. is a widow who lives alone and has been retired for several years. Today at 68, she enjoys playing bridge, attending concerts with friends, and exercising regularly at the local health spa. She often participates in active sports such as swimming and schedules a variety of activities for herself each day. Very efficient and rather businesslike, Mrs. X. works at maintaining her relatively extensive network of friends, for these relationships are very important to her. Although her network of friends and acquaintances is large, she reports she is somewhat unhappy about how little she sees her relatives and sometimes feels lonely. Mrs. X. appears to accept these and

other difficulties she faces as being outside her control and simply accepts them as "part of life."

## DISCUSSION

The data and analyses presented in this paper do not represent a final report of a completed theory verification study. They are, at least, elements in a progress report on the development of a model which might account for differences between normal, relatively unimpaired elderly persons and those of similar age who are functioning nearer their optimal levels. Even viewed in this light, there are limitations in what has been accomplished to date in this ongoing enterprise. The sample is small, particularly when contrasted with the number of characteristics measured for each individual. The procedure for selecting subsets of HBS and demographic variables to be utilized in isolating possible functional relationships between EF and QOL on the one hand, and HBS and demographic characteristics on the other hand, capitalize on chance so that shrinkage in the magnitude of the relationships might be expected in cross-validation attempts. Even more important than these limitations, perhaps, is the fact that the sample is not representative of the full range of functional effectiveness to which the model under development is eventually to be applied.

These limitations can be overcome in future work. The number of measures to be obtained on each participant will not

increase and may decrease as some are seen not to differentiate among persons functioning at different levels. Index measures may be generated or key characteristics may be selected to represent each HBS, further reducing the number of variables considered. With fewer variables and larger numbers of participants, variable selection will become less necessary, and the significance of chance relationships will diminish.

Increasing the diversity of the sample in future work also will be extremely important in the development of a theoretical model of effectiveness of functioning. It is now apparent that elderly persons who are fully functioning can be identified and that instruments with enough upper range to discriminate among them are available in each domain--EF and QOL as well as HBS and demographic. Future samples will include more typical elderly persons who will be without major impairments but less functionally elite--less afluent, less educated, somewhat less physically fit, and with less reliable social support systems.

Acknowledging limitations in work completed to date does not diminish its possible theoretical significance. On the basis of data on the small, functionally-elite sample, our answers to the specific questions raised at the beginning of this paper are:

1. Effectiveness of functioning is not a unitary trait, even in a subpopulation of elderly persons who are getting along very well by society's and their own standards. Among the five

dimensions of effectiveness tapped by the OARS MFAQ (social resources, economic resources, mental health, physical health, and activities of daily living), only mental health and activities of daily living were significantly correlated. Among the five QOL dimensions (active use of leisure time, personal development, self-fulfillment through others, family well-being, and friends and relatives), only use of leisure time and friends and relatives were significantly correlated. In light of these findings, it would appear that effectiveness is not a unitary trait that could be assigned a single index number without losing much information about elderly persons' areas of effectiveness.

2. Self-perceived quality of life is related to judged effectiveness in some areas, but the two constructs are not so congruent that one type of data can be substituted for the other. The two QOL dimensions which correlated significantly with EF were active use of leisure time and close friends and relatives. In each case they correlated significantly with mental health and activities of daily living. The pairs of measures within each instrument which were correlated were also correlated between instruments; a common factor involving the four measures might be postulated. However, the six other measures which were not correlated with others within or between instruments suggest substantial independence between self-perceived QOL and rated EF as well as within those measurement approaches.

3. The three pairs of canonical variables suggest that there are different sets of HBS and demographic variables which are predictive of constellations of EF and QOL measures. These represent three different typologies of effectively functioning elderly persons.

The first pair of canonical variables describe persons who are satisfied with their self-understanding, their education and work, their material comforts, and their close friends and relatives and who do, indeed, have strong social support systems. Such persons have positive self-concepts, are involved with others psychologically and in activities, and stay busy.

The second pair of canonical variates describe another type of effectively functioning elderly person. Individuals of this type may have reliable social support systems to fall back on, but they function independently. They are able to do so because they are economically comfortable, in good physical health, and able to perform without assistance their basic activities of daily living; they are generally satisfied with their family status. Such persons are physically active, have good incomes, have positive self-concepts, and engage in a number of activities alone. The married men living with wives in this sample were generally of this type.

The third pair of canonical variables describe still a third type of effectively-functioning elderly person. Individuals of

this type derive much satisfaction from their leisure time activities with their friends but have poor social support systems otherwise. They are less educated and feel less in control over external events but they do participate in physical activities.

The ultimate aim of this research is the development of a model of effectiveness of functioning in elderly persons through the use of human systems theory. Findings to date give reason to believe that such a model may be possible. They also suggest, however, that the model may be more complex and less unitary than the basic theory statement originally advanced. The diverse typologies identified so far are characterized by both judged EF and self-reported QOL which make these domains mutually supportive. That all typologies involve different subsets of HBS and demographic variables lends encouragement to the basic human systems approach to the developmental theory. The fact that many measures are more independent than expected may be due to the homogeneous, very highly functioning sample. As additional data are gathered on a more heterogeneous sample, the data are expected to lead to a model which may account more fully than is now possible for the differences between normal and fully-functioning elderly persons.

PD21/qolnorr.see

## References

Angyal, A. (1971). Foundations for a science of personality. New York: THe Commonwealth Fund.

Barnard, C. G. (1972, June). Psychological and interpersonal correlates of personality integration in fifth-grade boys of different race and social class. Unpublished doctoral dissertation, George Peabody College, Nashville.

Behrends, R. S., & Seeman, J. (1982). Personality integration and maximal use of biofeedback informataion. American Journal of Clinical Biofedback, 5, 116-126.

Belloc, N., & Breslow L. (1972). Relationship of physical health status and health practices. Preventive Medicine, 1, 409-421.

Belloc, N., Breslow, L., & Hochstim, J. (1971). Measurement of physical health. American Journal of Epidemiology, 93, 328-336.

BMDP. (1983). Statistical softwear. Berekeley, CA: University of California Press.

Bowles, S., & Wright, L. (1969). Personality integration in preadolescent males. Developmental Psychology, 2, 151.

Carter, F. J. (1983). Quality of life, adjustment, and stress among graduate students. Unpublished doctoral dissertation, George Peabody College for Teachers of Vanderbilt University, Nashville.

Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. Journal of Educational Psychologyg, 1-22.

Comalli, P. E. (1962). Interference effects of Stroop color-word test in childhood, adulthood, and aging. Journal of Genetic Psychology, 100, 47-53.

Cooley, R. S., & Seeman, J. (1979). Personality integration and social schemata. Journal of Personality, 47, 288-304.

Duncan, C. B. (1966). A reputation test of personality integration. Journal of Personality and Social Psychology, 3(5), 516-524.

Fillenbaum, G. G. et al. (1978). Assessment of individual functional status in a program evaluation and resource allocation model. In Multidimensional functional assessment: The OARS methodology manual, (2nd ed.). Duke University Center for the Study of Aging and Human Development.

Fitts, W. H. (1965). The Tennessee Self Concept Scale Manual. Nashville: Counselor Recordings and Tests.

Fitts, W. H., Adams, J. L., Radford, G., Richard, W. C., Thomas, B. K., Thomas, M M., & Thompson, W. (1971). The self-concept and self-actualization. Nashville: Counselor Recordings and Tests.

Fitts, W., Parks, R., & Larson, G. (in press). Manual for the Parks Mazes.

Flanagan, J. C. (1978). A research approach to improving our quality of life. American Psychologist, 33, 138-147.

Flanagan, J. C. (1979). Identifying opportunities for improving the quality of life of older age groups. Palo Alto, CA: American Institute for Research.

Foxman, P. N. (1976). Tolerance for ambiguity and self-actualiztion. Journal of Personality Asessment, 40, 67-72.

Hearn, C. B., & Seeman, J. (1971). Personality integration and perception of interpersonal relationships. Journal of Personality and Social Psychology, 18(2), 138-143.

Heath, D. H. (1965). Explorations of maturity. New York: Appleton-Century-Crofts.

Horn, J. L., & Donaldson, G. (1976). On the myth of intellectual decline in adulthood. American Psychologist, 701-719.

Landsman, T. (1968). The beautiful and noble person. Presidential address, Southeastern Psychological Association.

Laurie, W. F. (1977). The Duke OARS methodology. In Center reports on advances in research (Vol. 1). Durham, NC: Duke University Center for the Study of Aging and Human Development, p. 1.

Lewis, W. W. (1959). The construct validation of a reputation test. Unpublished doctoral dissertation, George Peabody College for Teachers, Nashville.

Nie, N. H. et al. (1975). SPSS: Statistical Package for the Social Sciences (2nd ed.). New York: McGraw-Hill.

Pattison, E. M. et al. (1975). A psychosocial kinship model for family therapy. American Journal of Psychiatry, 132, 1246-1251.

Richard, W. C. (1971). An approach to the study of personality integration and autonomic responsivity. Journal of Consulting and Clinical Psychology, 36, 298.

Riegel, K. F. (1979). Foundations of dialectical psychology. Academic Press, 129-156.

Schaie, K. W. (1974). Translations in gerontology--From lab to life: Intellectual functioning. American Psychologist, 802-807.

Seeman, J. (1966). Personality integration in college women. Journal of Personality and Social Psychology, 4, 91-93.

Seeman, J. (1983). Personality integration: Studies and reflections. New York: Human Sciences Press, Inc.

Seeman, J., Barry, E., & Ellinwood, C. (1963). Personality integration as a criterion of therapy outcome. Psychotherapy: Theory, Resesarch and Practice, 1, 14-17.

Swan, A. C. (1970). Personality integration and perceived behavior in a sensitivity training group. Unpublished doctoral dissertation, George Peabody College for Teachers, Nashville.

Thomas, M., & Seeman, J. (1971). Criterion measures for therapy outcome: A study in personality integration. Psychotherapy: Theory, Research and Practice, 8(1), 26-30.

Thomas, M., & Seeman, J. (1972). Personality integration and cognitive processes. Journal of Personality and Social Psychology, 24(2), 154-161.

Thurstone, L. L. (1944). A factorial study of perception. Chicago: University of Chicago Press.

Tiffany, D. W., Schontz, F. C., & Woll, S. B. (1969). A model of control. Journal of General Psychology, 81, 67-82.

## Author Note

Thanks are due to the following persons who participated in the early stages of this study: Dr. Patricia Chamings, of the Vanderbilt School of Nursing; Eleanor Kulikowski and Dana Rutledge, former faculty members; and Dr. Lori Adelson, of the Vanderbilt School of Medicine.

Table 1

Demographic Data on Apartment, Community, and Combined Samples.

| Variable | Sample | | |
|---|---|---|---|
| | Apartment | Community | Combined |
| Number of Participants | 14 | 17 | 31 |
| Number of Men | 2 | 5 | 7 |
| Number of Women | 12 | 12 | 24 |
| Mean Age | 77.00 | 70.76 | 73.58 |
| Age (Standard Deviation) | 6.29 | 5.59 | 6.84 |
| Median Income | $13,750 | $26,000 | $22,500 |
| Number Never Married | 4 | 0 | 4 |
| Number Living With Spouse | 1 | 10 | 11 |
| Number Widowed | 6 | 6 | 12 |
| Number Divorced | 2 | 2 | 4 |

Table 2

Summary Statistics on Selected Measures

| Subsystem and Measure | | M | SD |
|---|---|---|---|
| EF and QOL | | | |
| V1 | MFAQ Social Resources | 4.98 | .83 |
| V2 | MFAQ Economic Resources | 4.83 | .75 |
| V3 | MFAQ Mental Health | 4.97 | .85 |
| V4 | MFAQ Physical Health | 4.63 | .76 |
| V5 | MFAQ Activities of Daily Living | 5.35 | .41 |
| V6 | Active Use of Leisure | 16.19 | 4.06 |
| V7 | Personal Development | 15.67 | 3.10 |
| V8 | Self-Fulfillment Through Others | 14.17 | 4.22 |
| V9 | Family Well-Being | 13.16 | 5.71 |
| V10 | Friends and Relatives | 17.43 | 4.13 |
| Physiological | | | |
| V11 | Activities Involving Exercise | 2.87 | 2.14 |
| V12 | Pulse Change from Exercise | 8.77 | 5.71 |
| V13 | Worn Out at End of Day | 2.06 | .44 |
| Psychological | | | |
| V14 | Tennessee Self-Concept | -10.03 | 32.74 |
| V15 | Parks Mazes | 434.90 | 48.34 |
| V16 | Control Over External Events | 1.33 | .54 |

(table continues)

| Subsystem and Measure | | M | SD |
|---|---|---|---|
| Sociocultural | | | |
| V17 | Negativity in Social Network | 3.68 | 3.86 |
| V18 | Indifference in Social Network | 9.65 | 6.66 |
| V19 | Activities Engaged In Alone | 3.61 | 1.96 |
| Demographic | | | |
| V20 | Education | 15.68 | 2.74 |
| V21 | Income | $16,875[1] | $17,200[1] |

[1]Median and interquartile range.

Table 3

Intercorrelations Among EF, QOL, HBS, and Demographic Measures

| Variable | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Social | 1 | 1.00 | | | | | | | | | | | | | | | | | | | | |
| Economic | 2 | 0.18 | 1.00 | | | | | | | | | | | | | | | | | | | |
| Mental | 3 | 0.62 | -0.03 | 1.00 | | | | | | | | | | | | | | | | | | |
| Physical | 4 | 0.33 | 0.03 | 0.48 | 1.00 | | | | | | | | | | | | | | | | | |
| Adlive | 5 | 0.53 | 0.13 | 0.46 | 0.41 | 1.00 | | | | | | | | | | | | | | | | |
| Leisure | 6 | 0.06 | -0.19 | 0.15 | 0.15 | -0.06 | 1.00 | | | | | | | | | | | | | | | |
| Perdevel | 7 | 0.18 | 0.00 | 0.27 | 0.10 | 0.22 | 0.47 | 1.00 | | | | | | | | | | | | | | |
| Others | 8 | 0.26 | -0.01 | 0.32 | -0.05 | 0.18 | 0.17 | 0.54 | 1.00 | | | | | | | | | | | | | |
| Family | 9 | -0.10 | 0.18 | -0.05 | 0.01 | 0.10 | -0.08 | 0.09 | -0.22 | 1.00 | | | | | | | | | | | | |
| Friends | 10 | 0.21 | -0.00 | 0.17 | 0.28 | 0.08 | 0.44 | 0.52 | 0.39 | 0.05 | 1.00 | | | | | | | | | | | |
| Exercise | 11 | -0.16 | 0.34 | -0.25 | 0.06 | 0.04 | 0.08 | -0.05 | 0.07 | 0.09 | 0.08 | 1.00 | | | | | | | | | | |
| Pulscha | 12 | -0.38 | -0.16 | -0.41 | -0.47 | -0.60 | -0.03 | -0.18 | 0.03 | -0.32 | -0.10 | 0.02 | 1.00 | | | | | | | | | |
| Reserves | 13 | 0.00 | -0.07 | -0.08 | 0.17 | -0.13 | 0.09 | 0.07 | -0.42 | 0.10 | 0.03 | -0.17 | -0.19 | 1.00 | | | | | | | | |
| TSCS | 14 | 0.44 | 0.34 | 0.28 | 0.35 | 0.11 | 0.01 | 0.40 | 0.41 | 0.10 | 0.57 | 0.14 | -0.08 | -0.03 | 1.00 | | | | | | | |
| Parks | 15 | -0.20 | -0.28 | -0.16 | -0.16 | -0.29 | 0.28 | 0.10 | 0.00 | 0.17 | 0.20 | 0.01 | 0.41 | -0.11 | 0.09 | 1.00 | | | | | | |
| External | 16 | 0.47 | 0.00 | 0.19 | 0.13 | 0.35 | -0.40 | 0.05 | 0.22 | -0.09 | 0.08 | -0.11 | -0.08 | -0.00 | 0.29 | -0.10 | 1.00 | | | | | |
| Negative | 17 | -0.08 | 0.22 | -0.41 | -0.19 | -0.17 | 0.18 | 0.31 | 0.15 | 0.00 | 0.04 | 0.44 | 0.28 | -0.14 | 0.04 | 0.12 | -0.13 | 1.00 | | | | |
| Indifrnt | 18 | -0.48 | 0.23 | -0.46 | -0.14 | -0.04 | 0.09 | -0.12 | -0.24 | -0.05 | -0.22 | 0.46 | 0.09 | 0.02 | 0.50 | 0.03 | -0.32 | 0.43 | 1.00 | | | |
| Alone | 19 | -0.00 | 0.44 | -0.04 | -0.01 | 0.18 | 0.07 | -0.02 | 0.27 | -0.11 | -0.14 | 0.19 | -0.11 | -0.12 | 0.10 | -0.14 | -0.19 | 0.14 | 0.34 | 1.00 | | |
| Educ | 20 | 0.18 | 0.15 | 0.25 | -0.12 | 0.00 | -0.08 | -0.07 | -0.01 | -0.21 | -0.22 | 0.09 | -0.06 | -0.07 | 0.08 | -0.10 | -0.17 | -0.10 | -0.08 | 0.22 | 1.00 | |
| Income | 21 | 0.12 | 0.77 | -0.13 | 0.07 | 0.08 | -0.20 | -0.23 | -0.24 | 0.22 | -0.20 | 0.30 | -0.12 | 0.09 | 0.24 | -0.21 | -0.11 | 0.06 | 0.16 | 0.44 | 0.23 | 1.00 |

21, AB

Table 4

Correlations of Canonical Variables with Original Variables

| | | Canonical Variate | | |
|---|---|---|---|---|
| Measure | | 1 | 2 | 3 |
| | EF and QOL Subset | | | |
| V1 | MFAQ Social Resources | .39 | .33 | -.47 |
| V2 | MFAQ Economic Resources | -.16 | .81 | -.24 |
| V3 | MFAQ Mental Health | .22 | .02 | -.17 |
| V4 | MFAQ Physical Health | .27 | .36 | .19 |
| V5 | MFAQ Activities of Daily Living | -.03 | .45 | -.19 |
| V6 | Active Use of Leisure | .17 | -.08 | .62 |
| V7 | Personal Development | .58 | .18 | .24 |
| V8 | Self-Fulfillment Through Others | .06 | .19 | .15 |
| V9 | Family Well-Being | .23 | .32 | .28 |
| V10 | Friends and Relatives | .54 | .20 | .52 |
| | HBS and Demographic Subset | | | |
| V11 | Activities Involving Exercise | -.28 | .45 | .32 |
| V12 | Pulse Change From Exercise | -.16 | -.42 | .03 |
| V13 | Worn Out at End of Day | .40 | -.10 | -.04 |
| V14 | Tennessee Self-Concept | .53 | .52 | .02 |
| V15 | Parks Mazes | .17 | -.26 | .44 |

(table continues)

| Measure | | Canonical Variate 1 | 2 | 3 |
|---|---|---|---|---|
| V16 | Control Over External Events | .26 | .18 | -.50 |
| V17 | Negativity in Social Network | .12 | .29 | .10 |
| V18 | Indifference in Social Network | -.49 | .16 | .23 |
| V19 | Activities Engaged In Alone | -.50 | .50 | .06 |
| V20 | Education | -.11 | -.10 | -.44 |
| V21 | Income | -.24 | .69 | -.27 |